REMARKS

The Examiner's action and the grounds of objection and rejection stated therein have been carefully considered. Claim 1 has been amended in its preamble to more clearly recite that the inner space is defined by an inner wall "of a product adapted to fit the shape of a body part," to delete the objectionable language "using photogrammetrical methods . . . " and to make editorial revisions. Caim 1 now recites the step of photogrammetrically evaluating said recordings for determining the three dimensional shape.

Request to Withdraw Finality of Office Action

Under present practice, second actions on the merits are final except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an IDS. MPEP §706.07(a). Clearly, the rejection based upon Neiheisel et al is not based on any IDS submitted by applicant. In addition, the new ground of rejection was not necessitated by any amendment to the claims made by applicant. The only amendment to the claims made by applicant in the last amendment was substitution of the term "2-D cameras" for "imaging devices." In the original ground of rejection, the Examiner relied upon Jokinen, which was deficient as a reference in many important respects, most notably that Jokinen failed to teach an elastic envelope in contact with the inner wall and marked with marks facing the inside of the space, the use of reference marks and the corresponding pictures taken by a camera and evaluated in a photogrammetrical manner. Jokinen did, in fact, teach the use of a camera or imaging device, to take a reference picture of a specific arrangement of reference marks located outside of the container. In the new ground of rejection, the Examiner substitutes Neiheisel et al for Jokinen. However, the new ground of rejection was not made because Jokinen did not teach a 2-D camera and Neiheisel et al does. In fact, the new ground of rejection was made because the Examiner believes, as stated on page 4 of the office action, that Neiheisel et al teaches the provision of an elastic envelope marked with marks facing the inside of the interior of a vessel and the provision of an inspection device for producing a number of overlapping image recordings of the inner space, all of which were limitations which have always appeared in the claims. Thus, the new ground of rejection was necessitated by the

deficiencies of the originally cited Jokinen reference and not by the minor amendment made by applicant.

Accordingly, applicant requests reconsideration of the finality of the rejection of the last office action, on the ground that the finality designation was premature, and withdrawal of the finality of that office action.

Objection to Claims 5-6

Claims 5-6 are objected to as being in improper form under 37 CFR 1.75(c). The basis for the rejection is unclear from the language of the office action. Nevertheless, claims 5 and 6 are each dependent from multiple dependent claim 4. Inasmuch as base claim 4 refers to claims 1 to 3 in the alternative and neither of claims 5 or 6 recite multiple dependencies, it is submitted that claims 5-6 are in proper form. Claims 5-6 would only be improper if they recited multiple dependencies and referred back to other multiple dependent claims. See, MPEP §608.01(n)(I)(B)(4). If, upon reconsideration, the Examiner still believes that claims 5-6 are in improper form, he is requested to telephone undersigned counsel to expedite a resolution of this matter.

Rejection of Claim 1 Under 35 USC 112, second paragraph and 35 USC 101

Claim 1 stands rejected under 35 USC 112, second paragraph as being indefinite, the Examiner stating that the term "use of photogrammetrical methods" makes it unclear what method applicant is intending to encompass. The Examiner goes on to state that a claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced. In order to resolve this issue, applicant has amended claim 1 to actively and positively recite the step of "photogrammetrically evaluating said recordings . . . ." It is respectfully submitted that the step of photogrammetrically evaluating image recordings or photographs is well known in the art, has been well known for many years and need not be recited in a claim at this point in time in a step by step fashion. Not only is this step disclosed in the PCT applications which are identified on page 5 of the specification, applicant submits herewith an extract from "Close Range Photogrammetry and Machine Vision" edited by K.B. Atkinson (Whittles Publshing, 2001) as well as an extract from "The Handbook of Non-Topographic Photogrmmetry" published by The American Society of Photogrammetry in 1978.

Both of these publications, only a small portion of which is provided herein, teach and disclose in great detail how photogrammetric evaluation is accomplished. The Examiner can see from the Table of Contents included for each publication the broad range of teaching that was available to the skilled artisan long before the instant application was filed. In view of the well known practice of photogrammetric evaluation, the step of "photogrammetrically evaluating said recordings . . . " is in no respect indefinite. One skilled in the art would know exactly what this language means, as evidenced by the attached extracts. In such circumstances, where the scope of the claimed subject matter can be determined by one having ordinary skill in the art, a rejection under this paragraph is not appropriate. MPEP 706.03(d). It is commonplace in patent applications for well know procedures to be claimed by broadly recited steps where the step itself is not the point of novelty in the claim. For example, "freezing the solution" does not explain in step-by-step fashion how the freezing is accomplished. The mere statement of the step is sufficient. Another example might be "precipitating the impurities from the solution." Again, there is no step-by-step recitation of how precipitation is accomplished, but surely such a step is not indefinite. In view of the attached extracts, the same is true for "photogrammetrically evaluating said recordings . . . ."

Moreover, the Patent and Trademark Office has for many years recognized that photogrammetric evaluation of recordings and photographs is well known and that merely claiming the step of photogrammetric evaluation is not indefinite. See, e.g., U.S. Patent No. 5,911,126 (e.g., claims 11, 12-"photogrammetric methods"; "photogrammetric evaluation"), U.S. Patent No. 7,095,886 (e.g., claim 30-"photogrammetric evaluation process"), U.S. Patent No. 7,209,586 (e.g., claims 1-15-"photogrammetric process"; "photogrammetric evaluation process"; "evaluated photogrammetrically") and U.S. Patent No. 7,298,890 (e.g., claims 1-16-"photogrammetric evaluation process"). In view of the foregoing, reconsideration and withdrawal of the rejection under 35 USC 112, second paragraph is respectfully urged.

With respect to the rejection under 35 USC 101, in view of the amendment to claim 1, the claim no longer merely recites a use without setting forth any steps involved in the process. As pointed out hereinabove, the recitation in a method claim of "photogrammetrically evaluating . . . " is not indefinite and has been accepted by the Patent and Trademark Office for many years.

It follows that a claim incorporating this language is not an improper process claim under 35 USC 101. Accordingly, the rejection under 35 USC 101 should be reconsidered and withdrawn.

Rejection of Claims Over Prior Art

Claims 1, 7-8 and 10-11 stand rejected under 35 USC 103(a) as being unpatentable over Neiheisel et al (U.S. Patent No. 4,893,933) in view of Riegl et al (U.S. Patent No. 6,852,975), the Examiner stating that Neiheisel et al teaches all features of claim 1 except for using a photogrammetrical method for determining from said recordings the three-dimensional shape of that part of the interior space that was detected by the overlapping recordings. Riegl et al, according to the Examiner, teaches that it is well known to use photogrammetrical methods for determining from the recordings the three-dimensional shape of that part of the interior space that was detected by the overlapping recordings. This ground of rejection is respectfully traversed for the reasons which follow.

Claim 1 requires that the interior space defined by an inner wall of a product adapted to fit the shape of a body part, the 3-D shape of which is to be detected, is provided with an elastic envelope which itself is provided with marks that are adapted to be evaluated photogrammetrically. Next, a number of overlapping image recordings of the interior space are produced with one or more 2-D cameras and the recordings are photogrammetrically evaluated to determine the three-dimensional shape of the interior space. The present invention uses a photogrammetric evaluation process because it is inherently self-calibrating and requires no information about camera positions. The marks provided on the envelope, which face the interior space, provide the advantage that the exact spatial position and orientation of the camera do not have to be known. This is because the provided marks can be individually identified in a plurality of different images taken with a camera from respective different views. Therefore, no calibration is required and no special skill is needed to carry out the method of the present invention. Furthermore, by use of the present invention, it is possible to determine the three dimensional shape of an object with very high precision. This is especially helpful when the present invention is used for measuring the interior of products adapted to fit body parts, since high precision is required and persons fitting these products are unlikely to have special training

in the use of imaging equipment. However, using the method of the present invention, no additional technical staff are needed to carry out the measurements.

Neiheisel et al discloses portable inspection apparatus for determining the actual remaining thickness of a lining of a BOF vessel. According to this reference, a laser transmitter is used to direct a laser light beam towards a furnace lining (which is basically similar to the teaching of Riegl et al). The light being scattered from the vessel lining is received by a self-scanned linear array and correlated to provide a graphical representation of the actual remaining lining thickness. It is noteworthy that the light is scattered from the vessel lining itself and not from marks provided on a vessel lining. It will be appreciated that Neiheisel et al provides a technical teaching which is unrelated to that of the claimed present invention. According to the present invention, it is specifically required to take a series of images before the measurement is actually performed, by using a camera, with markings being provided on an elastic envelope in snug contact with the inner wall of the object. The obtained 2-D images are then overlaid for determining the inner dimensions of the object. By contrast, in Neiheisel et al, the inner wall is formed of pitch-impregnated magnesite brick and pitch-bonded magnesite brick (column 4, lines 53-56), which hardly qualifies as an elastic envelope, and no markings are provided thereon facing the inside of the interior space. Column 7, lines 17 to 29 of Neiheisel et al discloses that a laser transmitter directs the incident laser light beam towards an interior surface of a furnace vessel wall. When the topography of the original lining surface is scanned, the incident laser light beam will strike the inner surface at a point and be reflected along a nominal reflectance path. However, in the event that the lining contains a worn or damaged area, the incident laser light beam will strike the damaged area and be scattered along a different path. In other words, Neiheisel et al uses a method of imaging a surface based on scattering of a single incident laser light beam from the surface. There is absolutely no hint or suggestion in this reference of taking several 2-D images of the interior surface of the vessel wall having markings of any kind provided thereon, then overlaying these two-dimensional images to determine the inner dimensions of the vessel wall. The Examiner's assertion that Figures 4 and 12 of Neiheisel et al are overlapping images produced by 2-D cameras is clearly incorrect. Figure 4 is a graphical representation of the measured topography for a typical fumace bottom contour plot obtained

using the Neiheisel et al laser light beam (column 3, lines 65-68). Figure 12 is a diagrammatic illustration of a typical vessel volume illustrating a method of calculating steel bath height (column 4, lines 23-25) and is not an image, much less an overlapping image, produced by the Neiheisel et al laser light beam The teaching of Neiheisel et al hase no relevance whatever to that of the claimed invention since it does not require markings to be provided on an elastic envelope in snug contact with the inner wall of the object, does not use 2-D cameras to take images of the interior surface and does not require photogrammetric evaluation of the images, i.e., a subsequent overlaying of the images, to determine the three-dimensional shape of the interior space.

Riegl et al is cited to show that it is known in the art to use photogrammetrical methods for determining the three dimensional shape of that part of the interior space that was detected by the overlapping recordings. However, as pointed out in the response to the last office action, Riegl et al discloses a method for recording an object space with an opto-electronic distance sensor using a signal propagation time method and has absolutely nothing to do with the photogrammetrical method claimed in the instant application. The Riegl et al measurement principle is based on laser radiation. The laser beam is reflected from objects located in the target space and the propagation delay is measured. (See, Abstract). This is entirely different from the photogrammetrical method disclosed in the present application in which markings are provided on the interior of an object, then images are taken of that object which are later evaluated. In Riegl et al the distance images are taken in real time and use a transmitter and receiver for sending and receiving the optical signal. There is no hint or suggestion in Riegl et al to use a 2-D camera to obtain images of markings provided on a surface and then overlaying the images to obtain a self-calibrating measurement from the surface. Riegl et al does not require the provision of marks and fails to disclose any such marks. Moreover, Riegl et al fails to disclose or suggest the photogrammetrical evaluation of 2D-pictures taken from a 2D-camera, which is based on an overlay of overlapping multiple pictures of the interior of an object. Accordingly, neither Neiheisel et al nor Riegl et al, separately or together, teach the claimed method and no combination of their teachings can amount to the claimed method. For this reason, the rejections under 35 USC 103(a) over Neiheisel et al in view of Riegl et al do not

render any of rejected claims 1, 7-8 and 10-11 unpatentable and should be reconsidered and withdrawn.

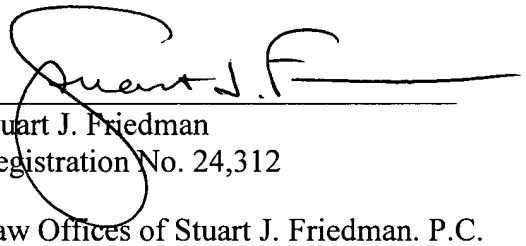
Claims 2, 4, 9 and 12 stand rejected under 35 USC 103(a) as unpatentable over Jokinen in view of Riegl et al and further in view of Pelrine (U.S. Patent No. 5,392,715). Pelrine is cited as showing that it is known in the art to provide the side of the marked envelope facing the inner wall with a means adhering to the inner wall prior to insertion into the interior spaces. Perline contains no such teaching. Rather, Perline deals with an entirely non-analogous subject matter, namely, in-pipe running robots for inspecting the inside of piping, and discloses that such robots may have adherent wheels to be able to run while adhering to running surfaces in vertically extending piping. There is no teaching in Perline of providing a marked elastic envelope, on the side facing the inner wall, with a means adhering to the inner wall prior to insertion of the envelope into the inner space. The disclosure of Perline has nothing whatever to do with the claimed subject matter and no combination of this teaching with the deficient teachings of Neiheisel et al and Riegl et al can amount to the claimed subject matter. Accordingly, this ground of rejection should be reconsidered and withdrawn.

Claim 13 stands rejected under 35 USC 103(a) as unpatentable over Neiheisel et al in view of Riegl et al and further in view of Ikeda et al (U.S. Patent No. 5,911,694). Ikeda et al is cited for teaching that it is known for overlapping image fields to be transmitted from the interior space to one or more imaging devices located outside the interior space via an endoscopic system. Ikeda does not even teach using an optical method for taking measurements, but rather employs a technique whereby frequency characteristics of a vibrator contacted to tissue are detected, thereby detecting parameters associated with the frequency characteristics of the vibrator so as to measure an endoceliac quantity. Moreover, the use of endoscopes to transmit images from an interior space to an imaging device outside of the interior space is well known, as was pointed out by applicant at page 2 of the specification. No combination of this teaching with the deficient teachings of Neiheisel et al and Riegl et al can amount to the claimed subject matter. Accordingly, this ground of rejection should be reconsidered and withdrawn.

Neither of the primarily relied upon references, Neiheisel et al or Riegl et al, alone or considered together teach or suggest the claimed method of optically detecting the three-

dimensional shape of an interior space by providing the interior space with an elastic envelope in snug contact with the inner wall, the envelope being provided with marks facing the inside of the space and adapted to be evaluated photogrammetrically, producing a number of overlapping image recordings of the interior space with the aid of one or more 2-D cameras, and photogrammetrically evaluating the recordings for determining the three-dimensional shape of that part of the interior space that was detected by the overlapping recordings. Accordingly, claim 1 and claims 2-13 dependent directly or indirectly from claim 1, are patentable over the art of record and should be allowed. Applicant gratefully acknowledges the indication that claim 3 contains allowable subject matter. However, inasmuch as applicant believes that all of claims 1-13 are allowable, it has not separately rewritten claim 3 at this time. Reconsideration of all grounds of rejection and an early allowance of claims 1-13 is courteously solicited.

Respectfully submitted,



Stuart J. Friedman
Registration No. 24,312

Law Offices of Stuart J. Friedman. P.C.
28930 Ridge Road
Mt. Airy, MD 21771
Telephone: (301) 829-1003
Facsimile: (301) 829-4107